

Software Glitch



The software on the Large Area Telescope failed, and must be reprogrammed.

Your opponent loses a Satellite or Object card. You choose and discard one of those cards from his or her hand, and place it in the Discard Pile.

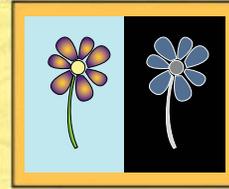


Shake n' Bake



An instrument did not pass the heat and vibration testing to prepare for launch.

Your opponent returns any Satellite or Object card from the mat to his or her hand.



False Positive



Fermi detected a potential gamma ray, but it turned out to be a cosmic ray.

Your opponent loses 2 turns.

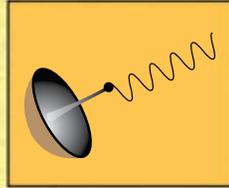


Interference



Solar activity prevented Fermi from obtaining data.

Take any 2 cards from your opponent's hand.



Disorientation



Your opponent's satellite received signals from many different spots, and doesn't know where to point.

You discard one of your opponent's Action cards. Place it in the Discard Pile.



Lead Scientist



A lead scientist was assigned to another project.

Your opponent loses an Experience card. You choose the Experience card, and place it in the Discard Pile.

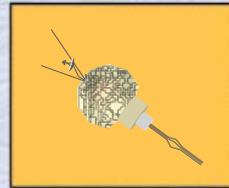


Funding Boost



Your proposal for further testing has been accepted, and NASA agrees to raise your budget.

Play another turn.

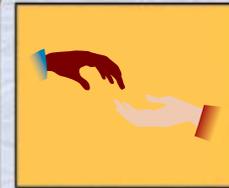


Eureka!



You found a faster and better analysis process for your data.

Discard 2 cards of your choice, and draw 2 cards from the Draw Deck.



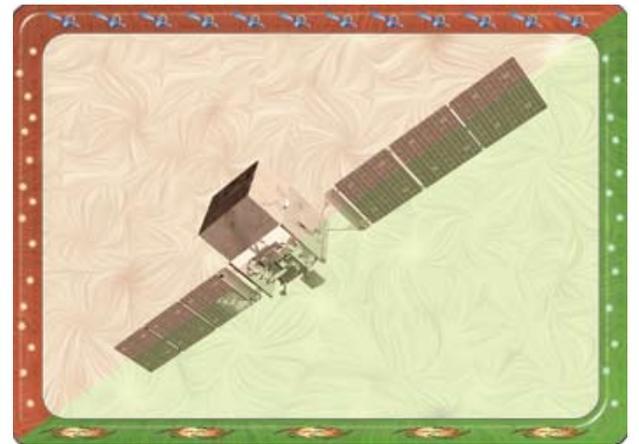
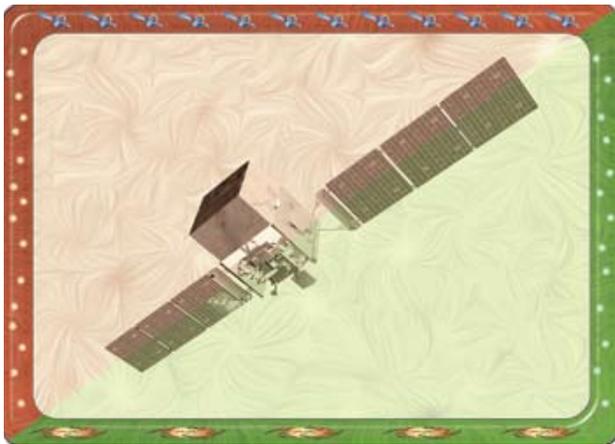
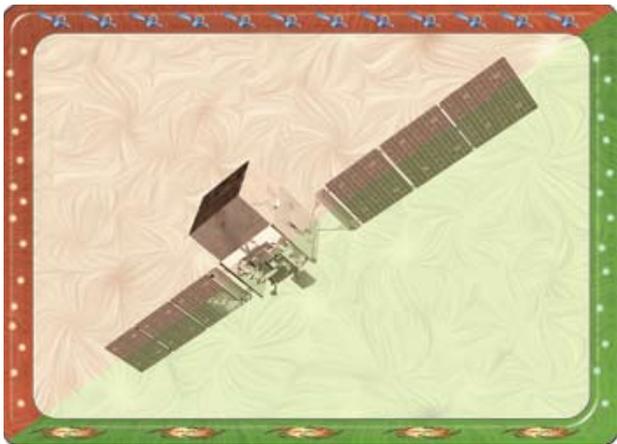
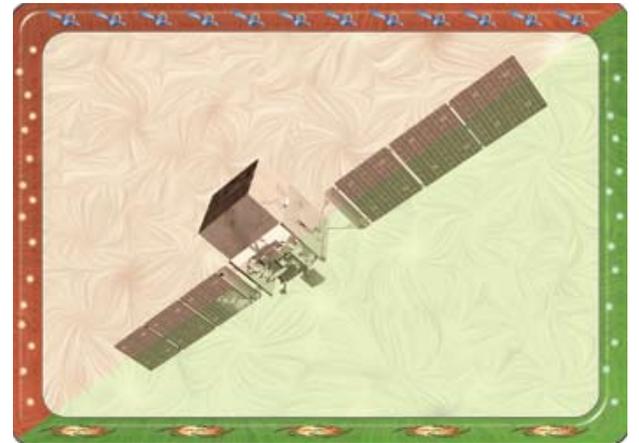
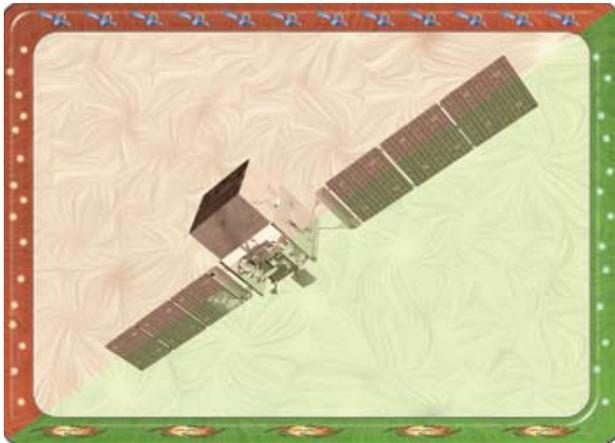
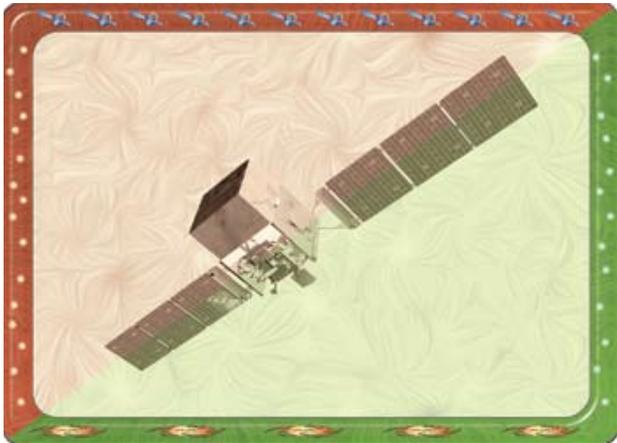
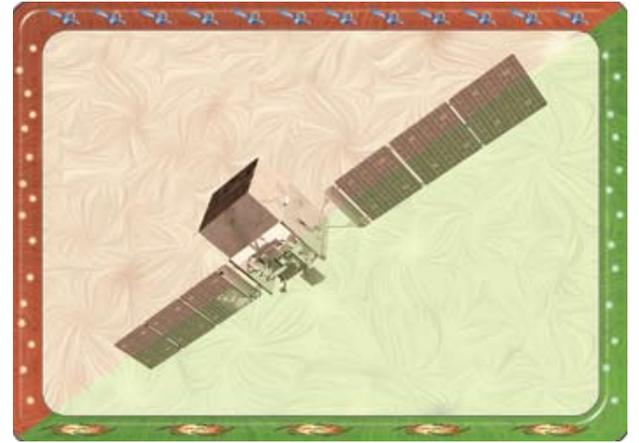
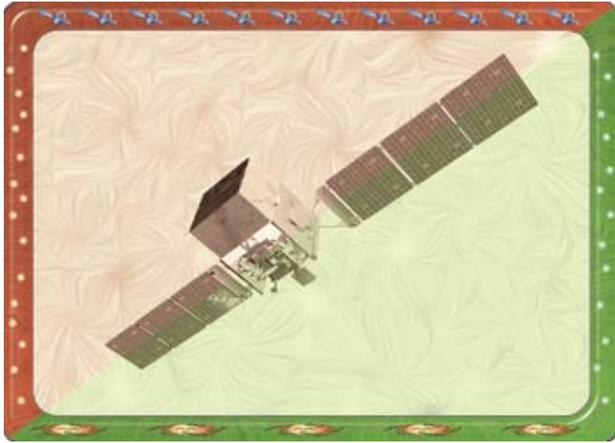
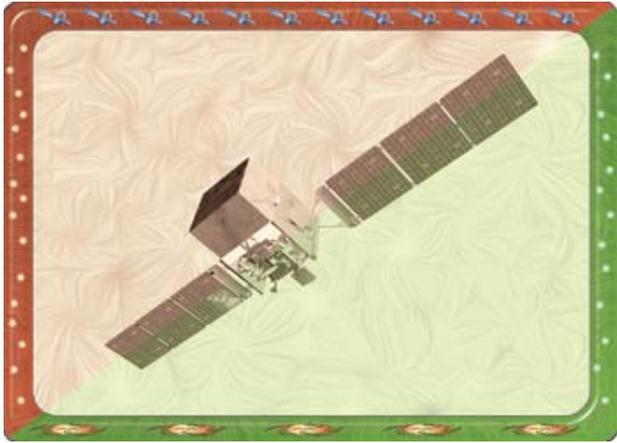
Cooperation



The testing deadline is approaching. You cooperate with your opponent to get Fermi ready on time.

Trade one card with your opponent. You both can choose which cards to trade.



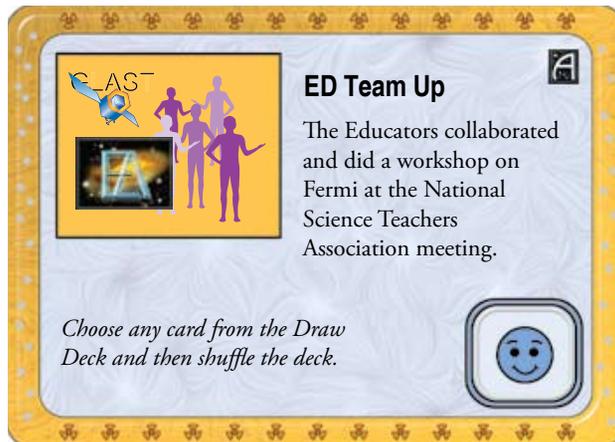




Unexpected Gamma-Ray Burst A

An unexpected burst occurred, and your satellite caught it!

You can play a Satellite or Object card - you do not need the required Experience cards.

ED Team Up A

The Educators collaborated and did a workshop on Fermi at the National Science Teachers Association meeting.

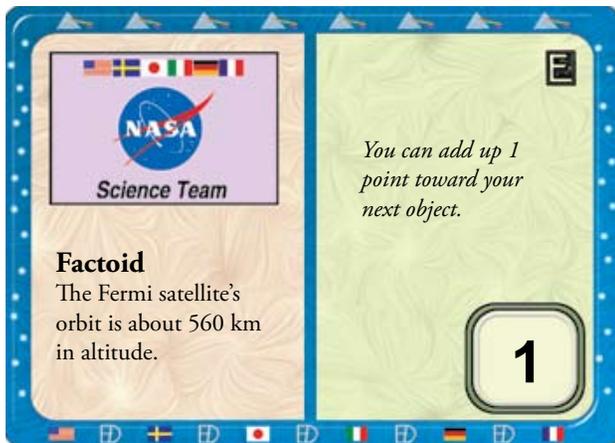
Choose any card from the Draw Deck and then shuffle the deck.




Unexpected Event A1

The Science Team made huge progress in the construction of the Large Area Telescope towers.

Cancel the effect of an Action played by your opponent. This card can be played at any time during your turn or your opponent's turn.

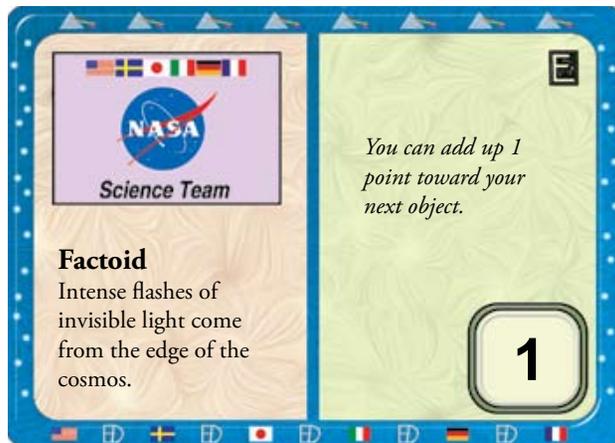



Science Team

You can add up 1 point toward your next object.

Factoid
The Fermi satellite's orbit is about 560 km in altitude.

1



Science Team

You can add up 1 point toward your next object.

Factoid
Intense flashes of invisible light come from the edge of the cosmos.

1



Science Team

You can add up 2 points toward your next object.

Factoid
Fermi's Gamma-ray Burst Monitor has 2 types of detectors to detect powerful bursts in a wide energy range.

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Gamma-ray astronomy studies the most energetic objects and phenomena in the Universe.

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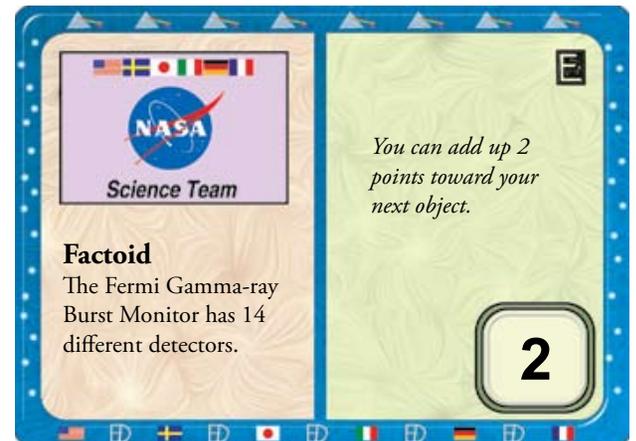


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Factoid
Fermi orbits the Earth once about every 90 minutes.

2

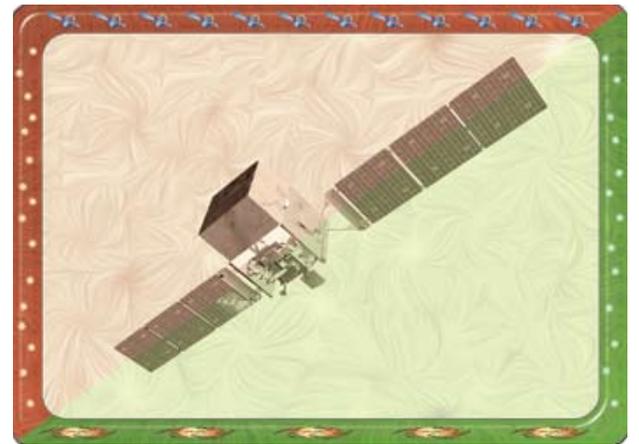
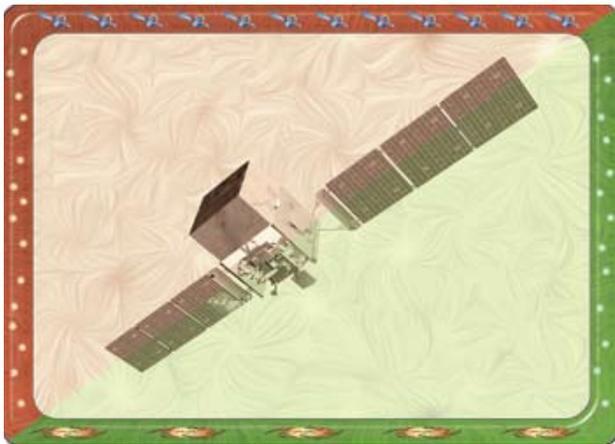
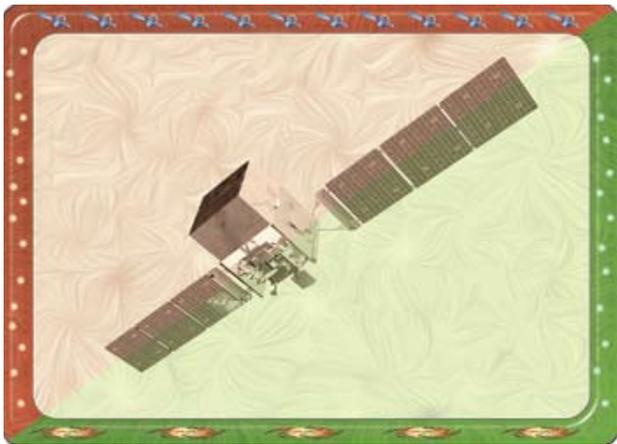
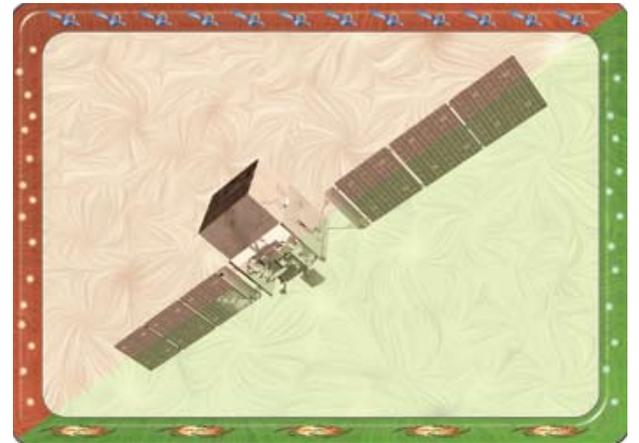
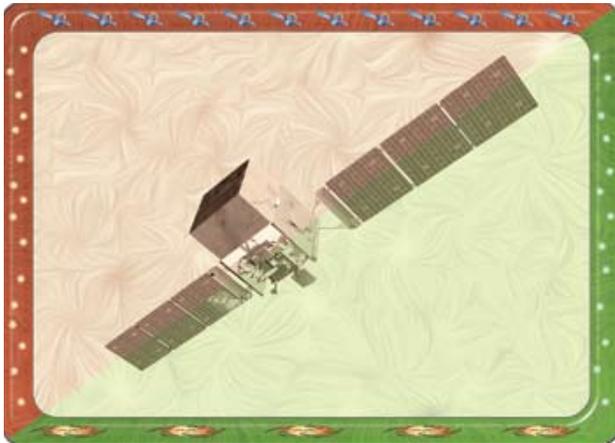
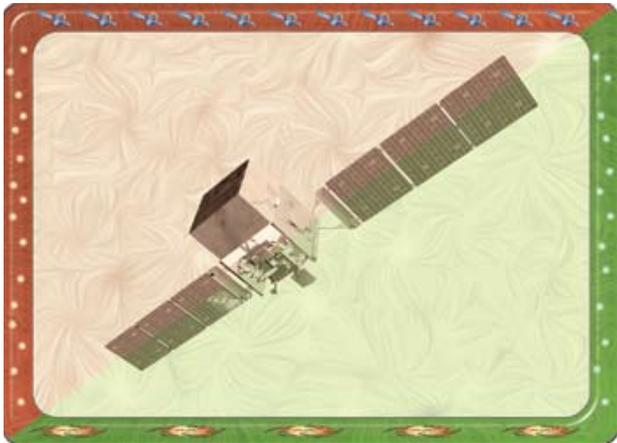
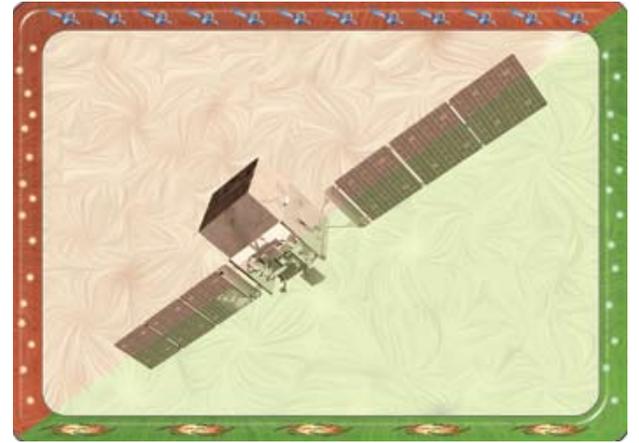
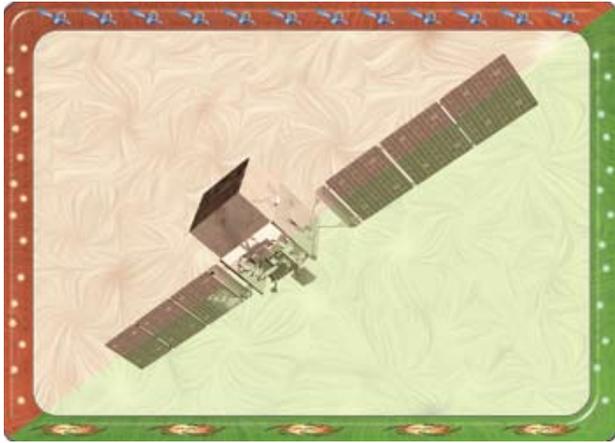
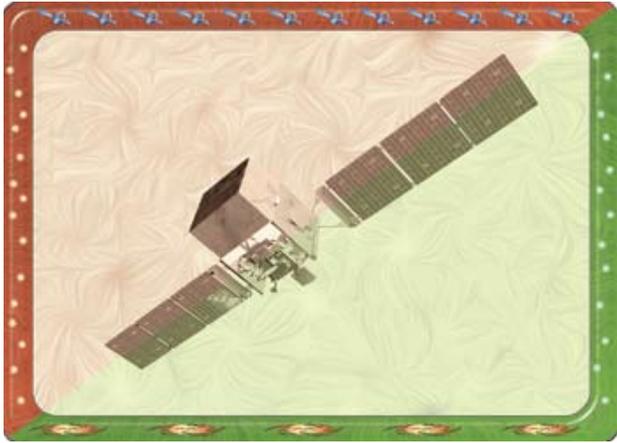


Science Team

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Factoid
The Fermi Gamma-ray Burst Monitor has 14 different detectors.

2





Factoid
The Fermi Large Area Telescope sees almost one quarter of the sky at all times.

You can add up 5 points toward your next object.

5



Factoid
The Fermi Large Area Telescope sees almost one quarter of the sky at all times.

You can add up 2 points toward your next object.

2



Factoid
Fermi supports 10 Educators who teach about Fermi science around the country.

You can add up 1 point toward your next object.

1



Factoid
The Large Area Telescope data provide high resolution maps of the gamma-ray sky.

You can add up 3 points toward your next object.

3



Factoid
The Fermi Large Area Telescope sees almost one quarter of the sky at all times.

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Factoid
Fermi's Gamma-ray Burst Monitor has 2 types of detectors to detect powerful bursts in a wide energy range.

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Factoid
There are 2 instruments on board Fermi: the Large Area Telescope, and the Gamma-ray Burst Monitor.

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The Fermi satellite's orbit is approximately 560 km in altitude.

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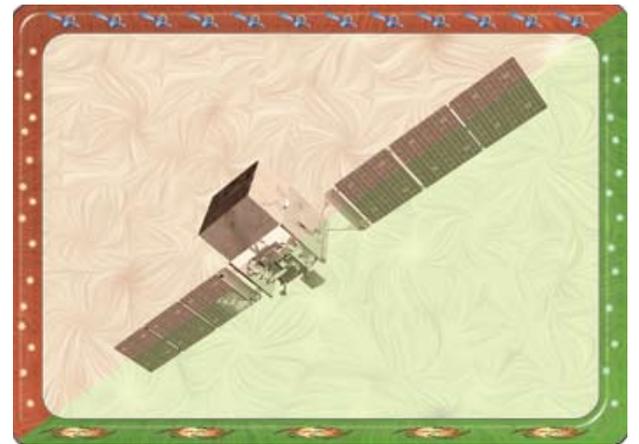
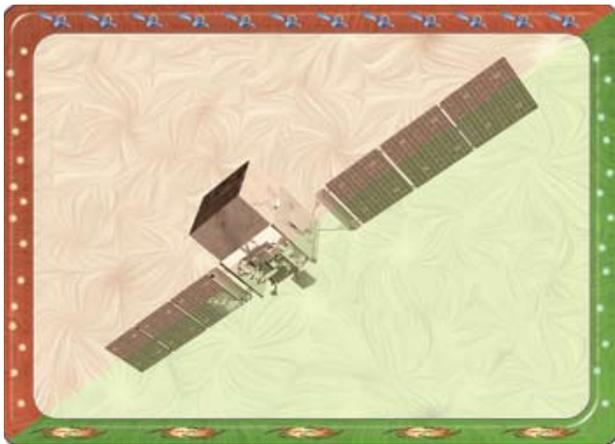
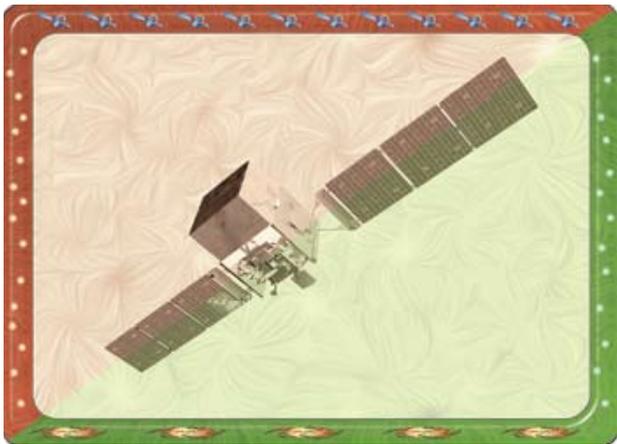
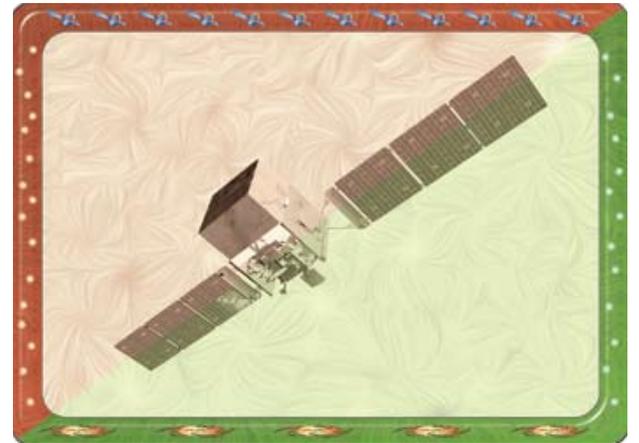
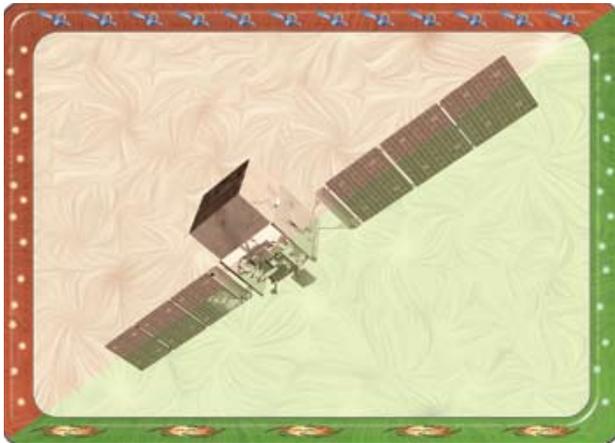
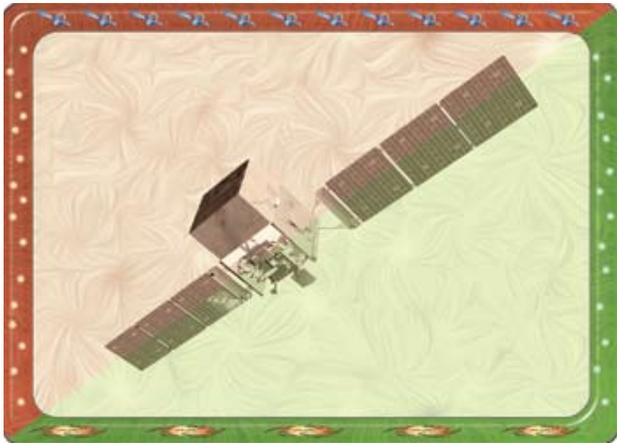
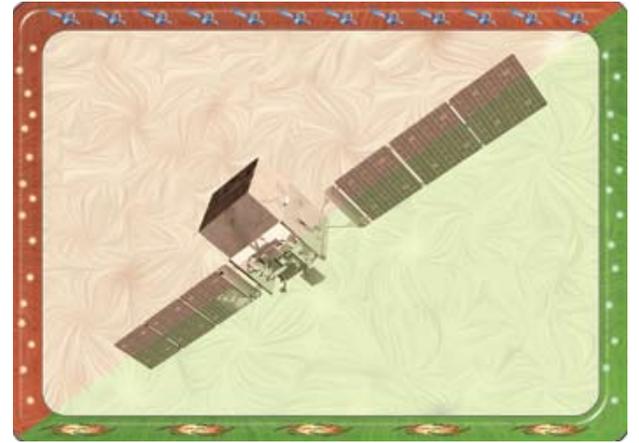
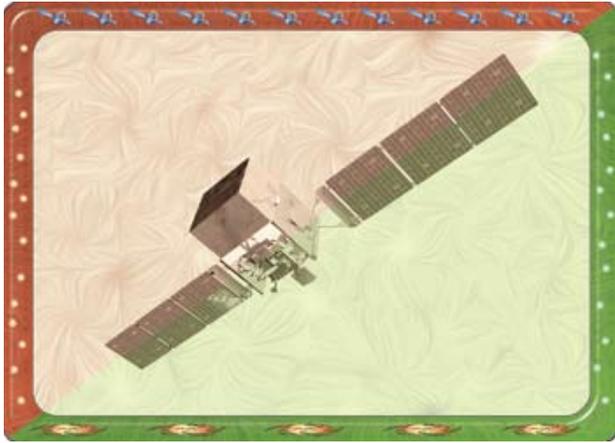
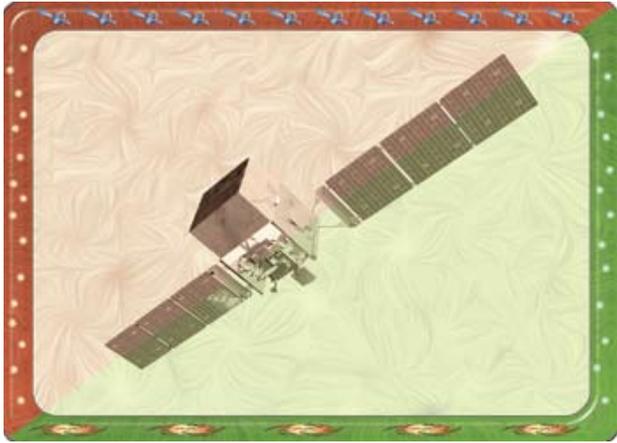
3



Factoid
The Fermi team is composed of scientists from around the world.

You can add up 2 points toward your next object.

2





Educators

Factoid
The Fermi mission is designed to last at least 5 years.

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Educators

Factoid
Gamma-ray astronomy studies the most energetic objects and phenomena in the Universe.

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Educators

Factoid
The Fermi Gamma-ray Burst Monitor has 14 different detectors.

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5



Educators

Factoid
The Large Area Telescope and Gamma-ray Burst Monitor are the two Fermi instruments.

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Educators

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The Fermi mission studies powerful objects and explosive events.

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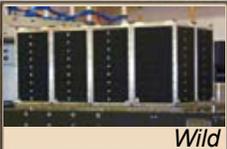


Wild

Factoid
Fermi launched on a Delta rocket from Cape Canaveral, Florida on June 11, 2008.

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2



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5



Wild

Factoid
The Large Area Telescope is an imaging wide field-of-view telescope.

You can add up 2 points toward your next object.

2



Wild

Factoid
The Large Area Telescope has 16 towers of detectors.

You can add up 3 points toward your next object.

3

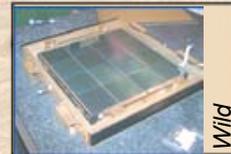



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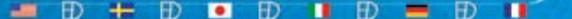



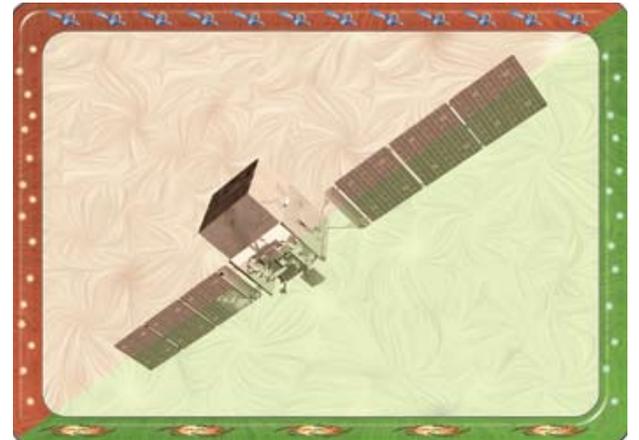
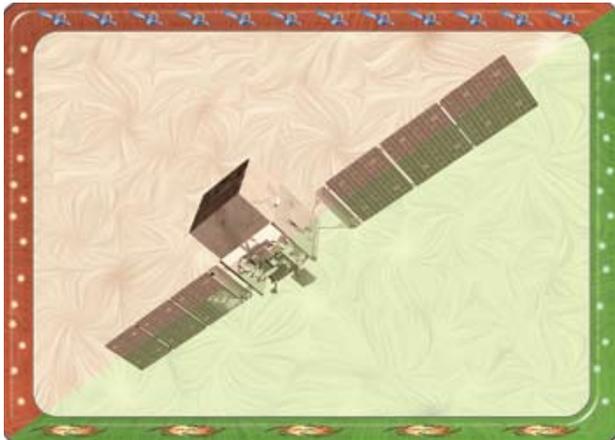
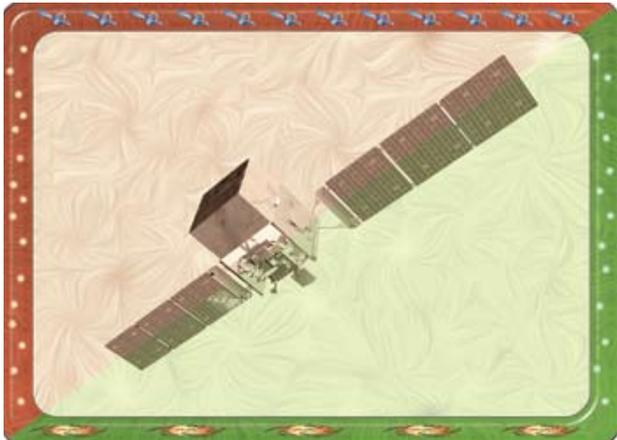
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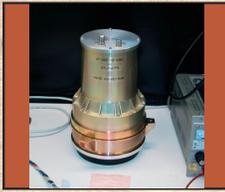




Gamma-ray Burst Monitor (GBM)



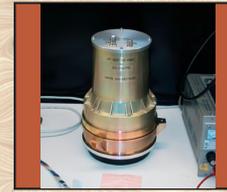
The Gamma-ray Burst Monitor is made of 2 sets of detectors. They are made of material which produces visible light from incoming gamma rays, capturing a wide range of energy coming from gamma-ray bursts.



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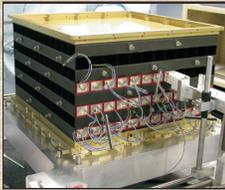
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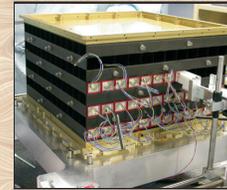
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Large Area Telescope (LAT)



The primary instrument of the Fermi satellite is the Large Area Telescope. Its measurements enable scientists to determine the energy and location in the sky of gamma rays.



Large Area Telescope (LAT)



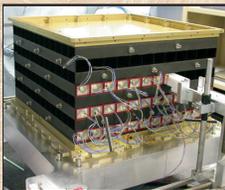
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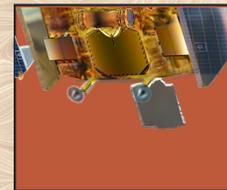
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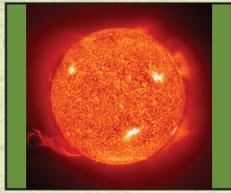


Communication Antenna



The Communication Antenna is used to send the information from the spacecraft's onboard computer system to ground control.

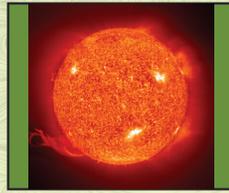




Solar Flare



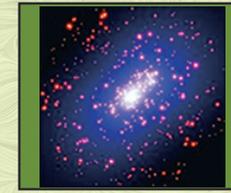
The interior of the Sun generates twisted, complex magnetic field lines. When these break and reconnect, they can generate vast amounts of energy emitted as gamma rays.



Solar Flare



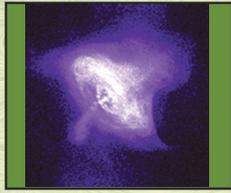
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Dark Matter



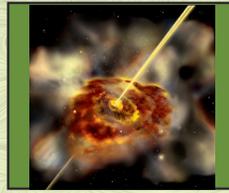
Dark Matter makes up more than 80% of the matter in the Universe. Fermi may be able to detect gamma rays from Dark Matter particles.



Pulsar



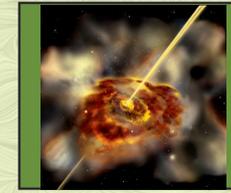
Rapidly spinning magnetic neutron stars create beams of energy that rotate like the beams of a lighthouse. When one sweeps over the Earth, we see a pulse of energy. Some pulsars emit gamma rays.



Active Galaxy



At the center of an Active Galaxy lies a monster: a supermassive black hole. Active Galaxies with jets, like the one shown here in an artist's illustration, are sites of gamma ray formation.



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Unidentified Sources



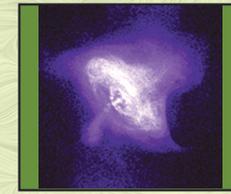
Fermi will detect gamma rays from many objects that are unknown at present. These sources may be the biggest discoveries of all.



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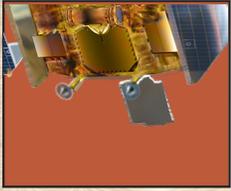


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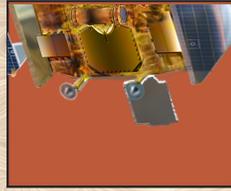




Communication Antenna



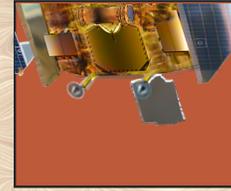
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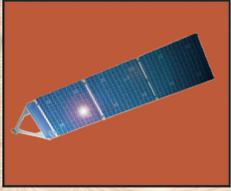
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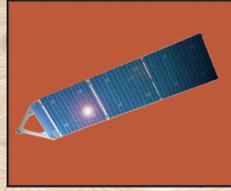
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Solar Panel



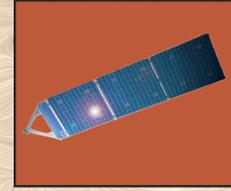
The Solar Panels power the spacecraft. Their purpose is to convert sunlight to electricity, which is then stored for use by the onboard electronics and computer systems.



Solar Panel



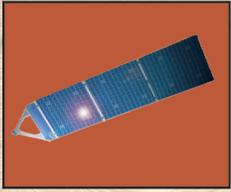
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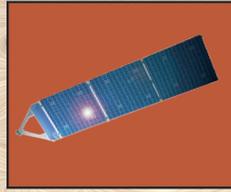
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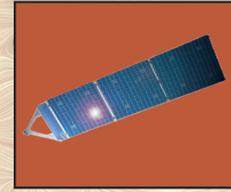
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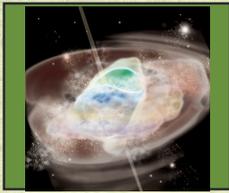


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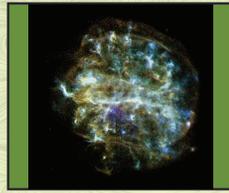




Merging Neutron Stars



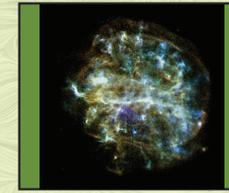
A Neutron Star is a dense remnant of a massive star. If two Neutron Stars orbit each other closely, they may eventually merge, creating a short-duration gamma-ray burst.



Supernova Remnant



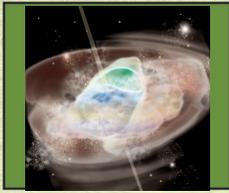
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Supernova Remnant



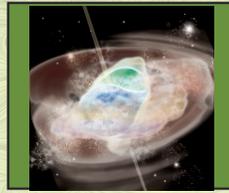
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Merging Neutron Stars



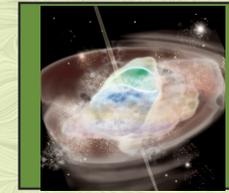
A Neutron Star is a dense remnant of a massive star. If two Neutron Stars orbit each other closely, they may eventually merge, creating a short-duration gamma-ray burst.



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Dark Matter



Dark Matter makes up more than 80% of the matter in the Universe. Fermi may be able to detect gamma rays from Dark Matter particles.



Unidentified Sources



Fermi will detect gamma rays from many objects that are unknown at present. These sources may be the biggest discoveries of all.

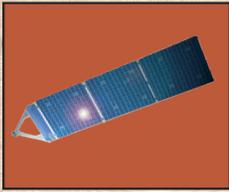


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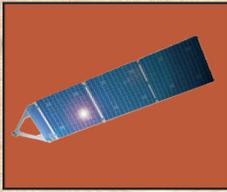




Solar Panel



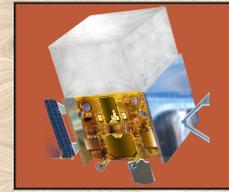
The Solar Panels power the spacecraft. Their purpose is to convert sunlight to electricity, which is then stored for use by the onboard electronics and computer systems.



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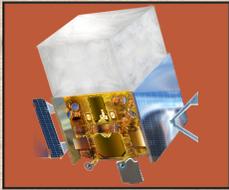
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Spacecraft Body



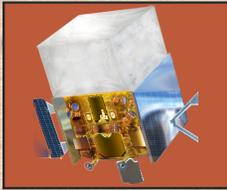
NASA's Fermi mission studies powerful objects and explosive events in order to understand Nature at its ultimate limits.



Spacecraft Body



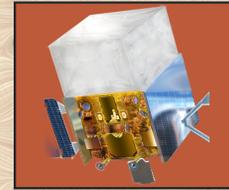
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Hypernova



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Hypernova



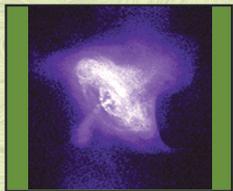
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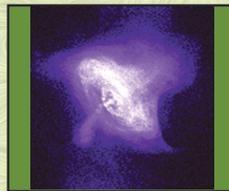
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Pulsar



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